

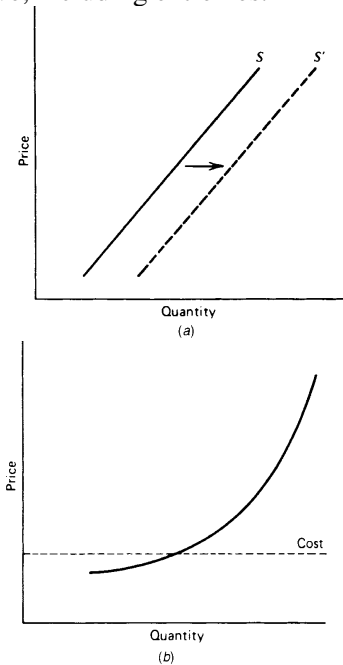
Kaufman - Trading Systems & Methods - Chap02 24-28

Chap02 24-28

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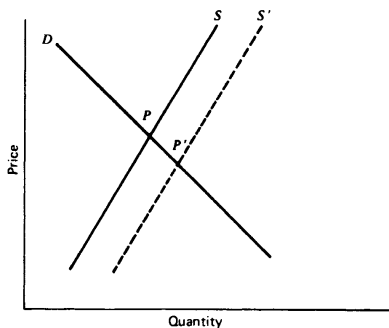
FIGURE 29 Supplyprice relationship (a) Shift in supply. (b) Supply curve, including extremes.



The demand line D and the original supply line S meet at the equilibrium price P . after the increase in supply, the supply line shifts to S' . The point of equilibrium P' represents a lower price, the consequence of larger supply with unchanged demand. Because supply and demand each have varying elasticities and are best represented by curves, the point of equilibrium can shift in any direction in a market with changing factors.

Equilibrium will be an important concept in developing trading strategies. Mthough the supply and demand balance may not be calculated, in practical terms equilibrium is a balance between buyers and sellers, a price level at which everyone is willing to trade. although always happy Equilibrium is associated with lower volatility and often lower volume, because the urgency to buy or sell has been removed.

FIGURE 210 Equilibrium with shifting supply.



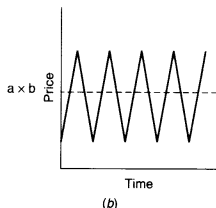
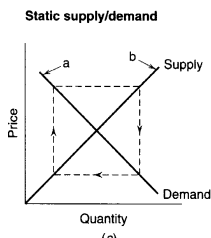
Cobweb Charts

The point at which the supply and demand lines cross is easily translated into a place on a price chart where the direction is sideways. The amount of price volatility during this sideways period depends upon the price level, market participation (called noise), and various undertones of instability caused by other factors. Very little is discussed about how price patterns reflect the shift in sentiment between the supply and demand lines, yet there is a clear representation of this action using cobweb charts.

Figure 21 1a shows a static (symmetric) supplydemand chart with dotted lines representing the cobweb. A shift in the perceived importance of supply and demand factors can

1 McKallip, Curtis, Jr. "Fundamentals behind technical analysis," *Technical Analysis of Stocks & Commodities* (November 1989).

FIGURE 211 Static supplydemand cobweb. (a) Dotted lines represent a shift of sentiment from supply to demand to supply, and so forth. (b) The price pattern likely to result from the cobweb in (a).



Source: Curtis McKallip, Jr., *Fundamentals behind technical analysis: Technical Analysis of Stocks & Commodities*, 7, no. 11 (November 1989). © 1989 by Technical Analysis, Inc. Used with permission.

cause prices to reflect the pattern shown by the direction of the arrows on the cobweb, producing the sideways market shown in **Figure 211b**. If the cobweb was closer to the intersection of the supply and demand lines, the volatility of the sideways price pattern would be lower; if the cobweb was further away from the intersection, the pattern would be more volatile.

Most supplydemand relationships are not static and can be represented by lines that cross at oblique angles. In **Figure 212a**, the cobweb is shown to begin near the intersection and move outward, each shift forming a different length strand of the web, moving away from equilibrium. **Figure 212b** shows that the corresponding price pattern is one that shifts from equilibrium to increasing volatility. A reversal in the arrows on the cobweb would show decreasing volatility moving toward equilibrium.

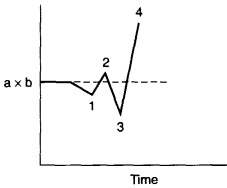
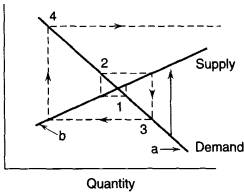
Building a Model

A model can be created to explain or forecast price changes. Most models explain rather than forecast. Explanatory models analyze sets of data at concurrent times, that is, they look for relationships between multiple factors and their effect on price at the same moment in time. They can also look for causal, or lagged relationships, in which prices respond to other factors after one or more days. It is possible to use the explanatory model to determine the normal price at a particular moment. Although not considered forecasting, any variation in the actual market price from the normal or expected price could present trading opportunities.

Methods of selecting the best forecasting model can affect its credibility. An analytic approach selects the factors and specifies the relationships in advance. Tests are then performed on the data to verify the premise. Many models, though, are refined by fitting the data, using regression analysis or shotgun testing, which applies a broad selection of variables and weighting to find the best fit. These models do not necessarily forecast but are definitely using perfect hindsight. Even an analytic approach that is subsequently finetuned could be in danger of losing its forecasting qualities.

The factors that comprise a model can be both numerous and difficult to obtain. **Figure 213** shows the interrelationship between factors in the cocoa industry. Although this chart is comprehensive in its intramarket relationships, it does not emphasize the global influences that have become a major part of price movement since the mid1970s. The **FIGURE 212** Dynamic supplydemand cobweb. (a) Dotted lines represent a cobweb moving away from equilibrium. (b) The price pattern shows increasing volatility.

Dynamic supply/demand



Source: Curtis McKallip, Jr., "Fundamentals behind technical analysis," *Technical Analysis of Stocks & Commodities* 7, no. 11 (November 1989). @ 1989 by Technical Analysis, Inc. Used with permission.

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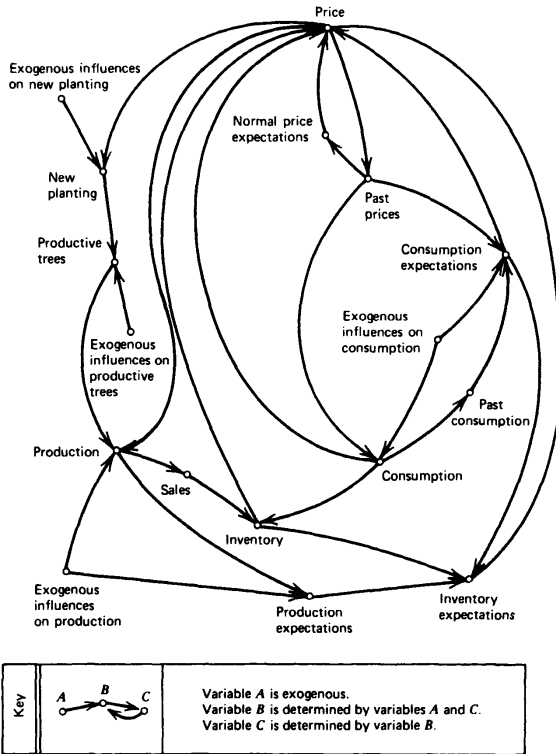
change in value of the U.S. dollar and the volatility of interest rates have had far greater influence on price than normal fundamental factors for many commodities.

Models that explain price movements must be constructed from the primary factors of supply and demand. A simple example for estimating the price of fall potatoes' is

$$P/PPI = a + bS + cD$$

'J.D. Schwager, 'A Trader's Guide to Analyzing the Potato Futures Market,' 1981 *Commodity Yearbook* (Cornmodity Research Bureau, New York, 198 1).

FIGURE 213 Cocoa factors.



Source.. E.N.Weymar, *The Dynamics of the World Cocoa Market* (Cambridge, MA. MIT Press, 1968, p. 2).

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where P is the average price of fall potatoes received by farmers; PPI is the Producer Price Index; S is the apparent domestic free supply (production less exports and diversions); D is the estimated deliverable supply; and a, b, and c are constants determined by regression analysis.

This model implies that consumption must be constant (i.e., inelastic demand); demand factors are only implicitly included in the estimated deliverable supply. Exports and diversion represent a small part of the total production. The use of the PPI gives the results in relative terms based on whether the index was used as an inflator or deflator of price.

A general model, presented by Weymar,¹ may be written as three behaviorbased equations and one identity:

(a) Consumption

$$C_t = f_C(P_t, P_t^1) + e_{C_t}$$

(b) Production

$$H_t = f_H(P_t, P_t^1) + e_{H_t}$$

(c) Inventory

$$I_t = I_{t-1} + H_t - C_t$$

(d) Supply of storage

$$P_t^1 - P_t = f_P(I_t) + e_P$$

where C is the consumption, P is the price, P' is the lagged price, H is the production (harvest), I is the inventory, P^e is the expected price at some point in the future, and e is the corresponding error factor.

The first two equations show that both demand and supply depend on current and/or lagged prices, the traditional macroeconomic theory, production and consumption are thus dependent on past prices. The third equation, inventory level, is simply the total of previous inventories, plus new production, less current consumption. The last equation, supply of storage, demonstrates that people are willing to carry larger inventories if they expect prices to increase substantially. The inventory function itself equation (c), is composed of two separate relationships: manufacturers' inventories and speculators' inventories. Each reacts differently to expected price change.

1 F.H. Weymar, *The Dynamics of the World Cocoa Market* (MIT Press, Cambridge, MA, 1968).